CLAIMS

1. A repeater, wherein a cell identifier generator module is added to the downlink circuit structure of said repeater, said cell identifier generator module comprising: a synchronization searching unit for searching for synchronization signal of base station, a time delay unit for generating fixed delay between frame start time of cell identifier signal and frame start time of base station pilot signal, and a cell identifier signal generating unit for generating cell identifier signal code word; said time delay unit generating the fixed delay according to the searching result of the synchronization searching unit.

2. A repeater according to claim 1, wherein: the input end of said cell identifier generator module is connected to the low-noise amplifier module of the repeater, and the output end of said cell identifier generator module is connected to the power amplifier module of the repeater via a coupler.

3. A repeater according to claim 2, wherein said cell identifier generator module also comprises: a down-conversion unit, an A/D (Analog to Digital) conversion unit, a D/A (Digital to Analog) conversion unit, a up-conversion unit, and a filtering unit; wherein said down-conversion unit is designed to carry out frequency conversion from RF to intermediate frequency for received signals; said A/D conversion unit is designed to carry out sampling and quantification for intermediate frequency signals; said D/A conversion unit is designed to carry out D/A conversion to obtain base-band form of the cell identifier signal; said up-conversion unit is designed to carry out conversion from base-band to RF for the cell identifier signal; said filtering unit is designed to carry out band restriction for the cell identifier signal to control frequency leakage to adjacent frequency; said cell identifier signal is coupled to input end of power amplifier in the downlink circuit structure of the repeater via said D/A unit,

up-conversion unit, and filtering unit.

4. A method for positioning mobile station, comprising:

(1) Issuing cell identifier signal code word, fixed delay, and search window width for the mobile station according to the positioning request of the mobile station;

(2) The mobile station utilizing TDOA measuring function to measure TDOAs of cell identifier signal and base station pilot signal and reporting the measured data;

(3) Determining whether there is a time difference consistent to the fixed delay between cell identifier signal and base station pilot signal according to the reported data from the mobile station; if so, going to step (4); otherwise going to step (7);

(4) Reading calibrated value TOA_c of TOA between the repeater and the base station, and initiating RIT (Round Trip Time) measuring function of the base station to measure RIT of the mobile station, herein TOA_c = (1/2) RIT;

(5) Converting the measured RIT reported from the base station into measured value TOA_m of TOA, herein TOA_m = (1/2) RIT, which is the TOA from the mobile station to the base station via the repeater, subtracting the calibrated value TOA_c of TOA from the repeater to the base station from TOA_m and taking the result as TOA TOA_{trans} from the mobile station to the repeater, herein $TOA_{trans} = TOA_m - TOA_c$;

(6) Calculating the distance between the mobile station and the repeater through multiplying TOA_{trans} with light velocity;

(7) Determining position of the mobile station with the mobile station positioning method.

5. A method for positioning mobile station according to claim 4, wherein said cell identifier signal is a scrambling code of the base station, which is different from that of the adjacent base stations.

6. A method for positioning mobile station according to claim 4, wherein said mobile station positioning method in step (7) is TDOA positioning method.

7. A method for positioning mobile station according to claim 4, wherein said mobile station positioning method in step (7) is TOA positioning method.